



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,638	02/27/2004	David L. Bender	Solaicx 4 US	9160
36743	7590	11/25/2008		
WOODSIDE IP GROUP P.O. BOX 61047 PALO ALTO, CA 94306			EXAMINER RAO, G NAGESH	
			ART UNIT	PAPER NUMBER
			1792	
			MAIL DATE	DELIVERY MODE
			11/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/789,638	Applicant(s) BENDER, DAVID L.	
	Examiner G. NAGESH RAO	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 12, 13, 15-17, 21-26 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14, 18-20 and 27-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/4/05, 1/17/06, 11/2/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1) Applicant's election without traverse of claims 1-11, 14, 18-20, and 27-33 in the reply filed on 6/23/08 is acknowledged.

Claims 12-13, 15-17, 21-26, and 34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/23/08.

This application contains claims 12-13, 15-17, 21-26, and 34 drawn to an invention nonelected without traverse in the reply filed on 6/23/08. A complete reply to the non-final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

35 USC § 112 6th Paragraph Invocation

2) As denoted in the claimed invention, there are claims directed towards the “annular heating means” and, “control means responsive to the sensor signals”, “means for adding dopant”, and the claims are therefore interpreted as based on the specification's teachings in accordance to 35 USC § 112 6th paragraph invocation.

Material Worked Upon/Recitation of Intended Use Apparatus Claims

3) Examiner wishes to point out that the currently claimed invention is directed towards an apparatus device, and although at times throughout the claim language, the word "system" is used, from broadest interpretation this is interpreted as pertaining to an apparatus. Furthermore the material worked upon in the apparatus is viewed as a recitation of intended use and does not structurally limit the claim. Please See MPEP 2112-115 for further details.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent

either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4) Claims 1-11, 14, 18-20, and 27-33 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14, 18-20, 22, and 24-30 of copending Application No. 10/525,824.

Although the conflicting claims are not identical, they are not patentably distinct from each other because both applications pertain to an apparatus device with a annular heating means, low aspect wide ratio crucible, and pre-melter used for the fabrication of single crystalline ingot material. Both sets of claims are similar to each other in scope and subject matter, the rationale for the rejection to be made.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5) Claims 1, 4, 6, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Altekruher (US Patent No. 5,360,480).

Altekruher 480 teaches a device capable of being used for single crystal ingot processing and manufacturing, whereby the teachings depict (Figure 1) a low aspect wide ratio melt crucible (that appears to fit within the 4:1 to 10:1 ratio of width to height) that includes a base and side walls (element 14) capable of holding molten material, a pre-fusing crucible (i.e. pre-melter element 25), the connection between the melt crucible and pre-melt crucible is via a tube (24) allowing for the capability for no vertical travel on the part of the melt crucible. Altekruher 480 also teaches a pair of annular heating coils (33, 34) located adjacent to the base of the crucible. Furthermore Altekruher 480 teaches capability of allowing for a dopant material to be added to the mix, as well the material mixed in the crucible (Also See Cols. 1-6 Lines 1-68).

6) Claim 14 is rejected under 35 U.S.C. 102(b) as being anticipated by Altekruher (US Patent No. 5,492,078).

Altekruger 078 pertains to the teaching of an apparatus device for the fabrication of single crystalline ingot materials, whereby it teaches a pre-melter device in conjunction with the melt crucible which is controlled via a computer based system, to regulate flow of the material through sensors throughout the device which specifically teaches a weight (reads on load cell) and level controller and flow control sensor means (See Figure 1, Abstract, and Cols 1-4, Lines 1-68).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
- 7) Claims 2-3, 11, 27-31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Altekruher (US Patent No. 5,360,480) in view of Azad (US Patent No. 5,162,072).

From the aforementioned rejection Altekruher 480 pertained to the teachings of a Cz apparatus device capable of being used for fabrication single crystalline materials.

However Altekruher 480 failed to explicitly teach the use of a controller system for the individual heaters on the apparatus device.

In the same field of endeavor Azad 072 pertains to the manufacturing of single crystalline materials, whereby the teachings include the use of a sensor and controller system in conjunction with the apparatus system (See Abstract, Col 2 Lines 35-68).

It would be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of Azad 072 with that of Altekruher 480 for the explicit advantage of “providing a vertically movable radial gradient heater disposed in a position to heat the bottom of the crucible to produce a desired radial temperature gradient or distribution across the bottom of the crucible, which

may be used to help establish and maintain a predetermined desired flow pattern in the melt disposed within the crucible, from which melt the crystal is pulled. The heater has individually controllable elements so that a precise radial temperature gradient may be accomplished."

8) Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Altekruher (US Patent No. 5,360,480) in view of Lorenzini (US Patent No. 4,454,096).

From the aforementioned rejection Altekruher 480 pertained to the teachings of a Cz apparatus device capable of being used for fabrication single crystalline materials.

However Altekruher 480 failed to explicitly teach the use of multiple crucible chambers.

In the same field of endeavor pertaining to CZ crystal manufacturing apparatus systems, Lorenzini 096 teaches the use of a plurality crucible chamber system (See Figure 1, Col 2 Lines 5-17).

It would be obvious to one having ordinary skill in the art at the time of the present invention, to incorporate the teachings of Lorenzini 096 with that of Altekruher 480 in order to take advantage of the ability to process faster and more

efficiently with multiple processing chambers. Furthermore Lorenzini 096 states the advantage of this system allows for the “reduction of the capital costs associated with the dual crucible approach to the formation of a plurality of boules from a single growth crucible. It accomplishes this by utilizing a single replenishment crucible to recharge a plurality of growth crucibles. Moreover, it provides intermittent communication of a replenishment crucible with one or more growth crucibles for recharging the latter with molten material as boules are sequentially grown (See Summary of Invention)”.

9) Claims 8-9 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Altekruiger (US Patent No. 5,360,480) in view of Azad (US Patent No. 5,162,072) in further view of Lorenzini (US Patent No. 4,454,096).

From section 7 of this rejection, describes the rationale for the combination of Altekruiger 480 in view of Azad 072.

However the hypothetical combination fails to disclose the necessity for a plurality of crystal growth chambers.

In the same field of endeavor pertaining to CZ crystal growth apparatuses, Lorenzini 096 teaches the use of a plurality crucible chamber system (See Figure 1, Col 2 Lines 5-17).

It would be obvious to one having ordinary skill in the art at the time of the present invention, to incorporate the teachings of Lorenzini 096 with that of the hypothetical combination of Altekruher 480 and Azad 072 in order to take advantage of the ability to process faster and more efficiently with multiple processing chambers. Furthermore Lorenzini 096 states the advantage of this system allows for the “reduction of the capital costs associated with the dual crucible approach to the formation of a plurality of boules from a single growth crucible. It accomplishes this by utilizing a single replenishment crucible to recharge a plurality of growth crucibles. Moreover, it provides intermittent communication of a replenishment crucible with one or more growth crucibles for recharging the latter with molten material as boules are sequentially grown (See Summary of Invention)”.

10) Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Altekruher (US Patent No. 5,360,480) in view of Azad (US Patent No. 5,162,072) in further view of Lorenzini (US Patent No. 4,454,096) in further view of Lim (US Patent No. 5,314,667).

From the aforementioned hypothetical combination as denoted in section 9 of this rejection, the combined teachings pertain to an apparatus for fabricating

single crystalline material. However the hypothetical combination fails to explicitly disclose the use of a "weir".

In the same field of endeavor pertaining to apparatus for fabricating single crystalline material, Lim 667 teaches the use of a weir (See Figure 2 Element 38 and Col. 3 Lines 55-63).

It would be obvious to one having ordinary skill in the art at the time of the present invention to include the use of a weir in the apparatus system for the explicit benefit of being able to divide out the molten zone of crystalline material in the crucible, allowing for concentrated pools of molten material to form prior to the pulling of the crystalline boule from the melt.

11) Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Altekruiger (US Patent No. 5,360,480) in view of Lim (US Patent No. 5,314,667).

Altekruiger 480 teaches a device capable of being used for single crystal ingot processing and manufacturing, whereby the teachings depict (Figure 1) a low aspect wide ratio melt crucible (that appears to fit within the 4:1 to 10:1 ratio of width to height) that includes a base and side walls (element 14) capable of holding molten material, a pre-fusing crucible (i.e. pre-melter element 25), the connection

between the melt crucible and pre-melt crucible is via a tube (24) allowing for the capability for no vertical travel on the part of the melt crucible. Altekruiger 480 also teaches a pair of annular heating coils (33, 34) located adjacent to the base of the crucible. Furthermore Altekruiger 480 teaches capability of allowing for a dopant material to be added to the mix, as well the material mixed in the crucible (Also See Cols. 1-6 Lines 1-68).

However Altekruiger 480 failed to explicitly teach the use of a weir nor explicitly state the crucible being comprised of a ceramic.

In the same field of endeavor pertaining to apparatus for fabricating single crystalline material, Lim 667 teaches the use of a weir in a quartz crucible (reading on a similar ceramic thereof) (See Figure 2 Element 38 and Col. 3 Lines 35-63).

It would be obvious to one having ordinary skill in the art at the time of the present invention to include the use of a weir in the apparatus system for the explicit benefit of being able to divide out the molten zone of crystalline material in the crucible, allowing for concentrated pools of molten material to form prior to the pulling of the crystalline boule from the melt as well utilize a quartz crucible in order to have a long-lasting and useful crucible in the device.

12) Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Altekruher US Patent No. 5,360,480) in view of JP 62176981.

Altekruher 480 teaches a device capable of being used for single crystal ingot processing and manufacturing, whereby the teachings depict (Figure 1) a low aspect wide ratio melt crucible (that appears to fit within the 4:1 to 10:1 ratio of width to height) that includes a base and side walls (element 14) capable of holding molten material, a pre-fusing crucible (i.e. pre-melter element 25), the connection between the melt crucible and pre-melt crucible is via a tube (24) allowing for the capability for no vertical travel on the part of the melt crucible. Altekruher 480 also teaches a pair of annular heating coils (33, 34) located adjacent to the base of the crucible. Furthermore Altekruher 480 teaches capability of allowing for a dopant material to be added to the mix, as well the material mixed in the crucible (Also See Cols. 1-6 Lines 1-68).

However Altekruher 480 failed to explicitly teach the crucible being coated with a ceramic based coating.

In the same field of endeavor pertaining to the design of crucibles for use in single crystalline apparatus systems, JP 981 teaches the use of a silicon carbide or a boron nitride coating (See Derwent Title and Abstract).

It would be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of JP 981 with that of Altekruher 481, for the benefit of improved adhesion “so that peeling due to the difference of thermal expansion coefficient are eliminated. Migration of impurities is also prevented. Strength is high and cost is lower due to the inexpensive graphite core”.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to G. NAGESH RAO whose telephone number is (571)272-2946. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mikhail Kornakov can be reached on (571) 272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GNR
/G. Nagesh Rao/

/Robert M Kunemund/

Primary Examiner, Art Unit 1792

Application/Control Number: 10/789,638
Art Unit: 1792

Page 16